SEQUENCE LISTING

<110> Glass, David J.
      Karow, Margaret
      Smith, Eric

<120> HIV-Specific Fusion Proteins and
      Therapeutic and Diagnostic Methods For Use

<130> REG 990A

<140> to be assigned
<141> 2004-01-30

<150> US 60/446,347
<151> 2003-02-10

<160> 18

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 446
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 1
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1   5   10   15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20   25   30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
        35   40   45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
    50   55   60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65   70   75   80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
            85   90   95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
            100   105   110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
        115   120   125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
    130   135   140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145   150   155   160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
            165   170   175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
            180   185   190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu

1

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              195                        200                        205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
    210                        215                        220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                        230                        235                        240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                   245                        250                        255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
               260                        265                        270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
               275                        280                        285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
    290                        295                        300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                        310                        315                        320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                   325                        330                        335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
               340                        345                        350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
               355                        360                        365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                        375                        380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                        390                        395                        400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                   405                        410                        415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
               420                        425                        430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
               435                        440                        445


<210> 2
<211> 450
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 2
Arg Ser Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys
 1               5                        10                        15
Lys Gly Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser
               20                        25                        30
Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn
           35                        40                        45
Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala
       50                        55                        60
Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile
65                        70                        75                        80
Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu
               85                        90                        95
Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn
               100                        105                        110
Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu
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2

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                115                    120                    125
Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly
    130                    135                    140
Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu
145                    150           ˙       155                    160
Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys
                165                    170                    175
Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Thr Arg Asp Tyr Gln
                180                    185                    190
Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser Glu Pro Ser
                195                    200                    205
Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu Ser Gly Asp
    210                    215                    220
Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
225                    230                    235                    240
Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
                245                    250                    255
Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu
                260                    265                    270
Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His
                275                    280                    285
Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg
                290                    295                    300
Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys
305                    310                    315                    320
Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu
                325                    330                    335
Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr
                340                    345                    350
Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu
                355                    360                    365
Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
                370                    375                    380
Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val
385                    390                    395                    400
Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
                405                    410                    415
Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His
                420                    425                    430
Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                435                    440                    445
Gly Lys
450


<210> 3
<211> 436
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 3
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5                    10                   15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
```

3

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              20                          25                          30
Thr Arg Gly Gly Ala Ile Ala Thr Val Glu Leu Thr Cys Thr Ala Ser
         35                          40                          45
Gln Lys Lys Ser Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys
      50                          55                          60
Ile Leu Gly Asn Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu
65                          70                          75                    80
Asn Asp Arg Ala Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe
                        85                          90                          95
Pro Leu Ile Ile Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile
            100                         105                         110
Cys Glu Val Glu Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly
         115                         120                         125
Leu Thr Ala Asn Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr
      130                         135                         140
Leu Thr Leu Glu Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg
145                         150                         155                   160
Ser Pro Arg Gly Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser
                        165                         170                         175
Gln Leu Glu Leu Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln
            180                         185                         190
Asn Gln Lys Lys Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser
            195                         200                         205
Gly Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
      210                         215                         220
Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu
225                         230                         235                   240
Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
                        245                         250                         255
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu
            260                         265                         270
Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr
      275                         280                         285
Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
      290                         295                         300
Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro
305                         310                         315                   320
Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
            325                         330                         335
Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val
            340                         345                         350
Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
            355                         360                         365
Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
      370                         375                         380
Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
385                         390                         395                   400
Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
                        405                         410                         415
Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
            420                         425                         430
Ser Pro Gly Lys
            435


<210> 4
<211> 621




                                    4
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<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 4
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
1   5   10   15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20   25   30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
            35   40   45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
        50   55   60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65   70   75   80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
                85   90   95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
            100   105   110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
        115   120   125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
        130   135   140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145   150   155   160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
                165   170   175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
            180   185   190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
            195   200   205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Phe Gln Lys Ala Ser
    210   215   220
Ser Ile Val Tyr Lys Lys Glu Gly Glu Gln Val Glu Phe Ser Phe Pro
225   230   235   240
Leu Ala Phe Thr Val Glu Lys Leu Thr Gly Ser Gly Glu Leu Trp Trp
                245   250   255
Gln Ala Glu Arg Ala Ser Ser Ser Lys Ser Trp Ile Thr Phe Asp Leu
            260   265   270
Lys Asn Lys Glu Val Ser Val Lys Arg Val Thr Gln Asp Pro Lys Leu
            275   280   285
Gln Met Gly Lys Lys Leu Pro Leu His Leu Thr Leu Pro Gln Ala Leu
    290   295   300
Pro Gln Tyr Ala Gly Ser Gly Asn Leu Thr Leu Ala Leu Glu Ala Lys
305   310   315   320
Thr Gly Lys Leu His Gln Glu Val Asn Leu Val Val Met Arg Ala Thr
                325   330   335
Gln Leu Gln Lys Asn Leu Thr Cys Glu Val Trp Gly Pro Thr Ser Pro
            340   345   350
Lys Leu Met Leu Ser Leu Lys Leu Glu Asn Lys Glu Ala Lys Val Ser
            355   360   365
Lys Arg Glu Lys Ala Val Trp Val Leu Asn Pro Glu Ala Gly Met Trp
    370   375   380
Gln Cys Leu Leu Ser Asp Gly Ala Ser Gly Asp Lys Thr His Thr Cys
385   390   395   400

5

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Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu
            405                     410                 415
Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            420                     425                 430
Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys
            435                     440                 445
Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
      450                     455                 460
Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu
465                     470                 475                 480
Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
            485                     490                 495
Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            500                     505                 510
Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
            515                     520                 525
Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
            530                     535                 540
Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
545                     550                     555                 560
Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
                  565                     570                 575
Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
            580                     585                 590
Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
            595                     600                 605
His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
      610                     615                 620


<210> 5
<211> 611
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 5
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5                   10                  15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20                      25                  30
Thr Arg Gly Gly Ala Ile Ala Thr Val Glu Leu Thr Cys Thr Ala Ser
            35                      40                  45
Gln Lys Lys Ser Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys
      50                      55                  60
Ile Leu Gly Asn Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu
65                      70                      75                  80
Asn Asp Arg Ala Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe
            85                      90                  95
Pro Leu Ile Ile Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile
            100                     105                 110
Cys Glu Val Glu Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly
            115                     120                 125
Leu Thr Ala Asn Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr
            130                     135                 140
```

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Leu Thr Leu Glu Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg
145                 150                 155                 160
Ser Pro Arg Gly Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser
                165             170             175
Gln Leu Glu Leu Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln
            180             185             190
Asn Gln Lys Lys Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser
        195             200             205
Gly Phe Gln Lys Ala Ser Ser Ile Val Tyr Lys Lys Glu Gly Glu Gln
    210             215             220
Val Glu Phe Ser Phe Pro Leu Ala Phe Thr Val Glu Lys Leu Thr Gly
225             230             235             240
Ser Gly Glu Leu Trp Trp Gln Ala Glu Arg Ala Ser Ser Ser Lys Ser
            245             250             255
Trp Ile Thr Phe Asp Leu Lys Asn Lys Glu Val Ser Val Lys Arg Val
            260             265             270
Thr Gln Asp Pro Lys Leu Gln Met Gly Lys Lys Leu Pro Leu His Leu
            275             280             285
Thr Leu Pro Gln Ala Leu Pro Gln Tyr Ala Gly Ser Gly Asn Leu Thr
    290             295             300
Leu Ala Leu Glu Ala Lys Thr Gly Lys Leu His Gln Glu Val Asn Leu
305             310             315             320
Val Val Met Arg Ala Thr Gln Leu Gln Lys Asn Leu Thr Cys Glu Val
            325             330             335
Trp Gly Pro Thr Ser Pro Lys Leu Met Leu Ser Leu Lys Leu Glu Asn
            340             345             350
Lys Glu Ala Lys Val Ser Lys Arg Glu Lys Ala Val Trp Val Leu Asn
    355             360             365
Pro Glu Ala Gly Met Trp Gln Cys Leu Leu Ser Asp Gly Ala Ser Gly
    370             375             380
Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
385             390             395             400
Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
            405             410             415
Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            420             425             430
Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
    435             440             445
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
    450             455             460
Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
465             470             475             480
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
            485             490             495
Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
            500             505             510
Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
    515             520             525
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
    530             535             540
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
545             550             555             560
Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
            565             570             575
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
            580             585             590
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
```

```
              595                  600                  605
Pro Gly Lys
      610


<210> 6
<211> 476
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 6
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
  1               5                  10                  15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20                  25                  30
Thr Arg Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr
        35                  40                  45
Thr Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg
    50                  55                  60
Leu Leu Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly Asp Thr
65                  70                  75                  80
Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln Phe His
                85                  90                  95
Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly Ser Phe
            100                 105                 110
Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser Arg Arg
            115                 120                 125
Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn Leu Lys
        130                 135                 140
Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln Lys Glu
145                 150                 155                 160
Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp Thr His
                165                 170                 175
Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro Pro Gly
            180                 185                 190
Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn Ile Gln
            195                 200                 205
Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp Ser Gly
        210                 215                 220
Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu Phe Lys
225                 230                 235                 240
Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr Cys Pro
                245                 250                 255
Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe
            260                 265                 270
Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val
            275                 280                 285
Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe
        290                 295                 300
Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro
305                 310                 315                 320
Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr
            325                 330                 335
Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val
```

8

```
                  340                      345                      350
Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala
              355                      360                      365
Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
          370                      375                      380
Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly
385                      390                      395                      400
Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
                  405                      410                      415
Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser
              420                      425                      430
Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln
          435                      440                      445
Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His
      450                      455                      460
Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
465                      470                      475


<210> 7
<211> 483
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 7
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5                      10                      15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
              20                      25                      30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
          35                      40                      45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
      50                      55                      60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65                      70                      75                      80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
              85                      90                      95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
          100                      105                      110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
          115                      120                      125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
      130                      135                      140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145                      150                      155                      160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
              165                      170                      175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
          180                      185                      190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
          195                      200                      205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
      210                      215                      220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
```

9

```
     225                   230                   235                   240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                   250                   255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                   265                   270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
            275                   280                   285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
        290                   295                   300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                   310                   315                   320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                   330                   335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                   345                   350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
            355                   360                   365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
        370                   375                   380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                   390                   395                   400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                405                   410                   415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                   425                   430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Ala Ser
            435                   440                   445
Ala Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr
        450                   455                   460
Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu
465                   470                   475                   480
Leu Ser Arg


<210> 8
<211> 453
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 8
Arg Ser Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys
 1               5                   10                  15
Lys Gly Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser
            20                  25                  30
Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn
            35                  40                  45
Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala
        50                  55                  60
Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile
65                  70                  75                  80
Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu
                85                  90                  95
Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn
```

10

```
                 100                     105                     110
Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu
        115                     120                     125
Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly
    130                     135                     140
Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu
145                     150                     155                     160
Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys
                165                     170                     175
Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr
            180                     185                     190
His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser
            195                     200                     205
Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg
    210                     215                     220
Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro
225                     230                     235                     240
Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala
                245                     250                     255
Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val
                260                     265                     270
Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr
        275                     280                     285
Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr
    290                     295                     300
Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
305                     310                     315                     320
Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys
            325                     330                     335
Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
            340                     345                     350
Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp
        355                     360                     365
Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
    370                     375                     380
Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala
385                     390                     395                     400
Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
            405                     410                     415
Ala Ser Ala Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr
        420                     425                     430
Tyr Thr Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala
        435                     440                     445
Arg Leu Leu Ser Arg
    450


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<211> 446
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<220>
<223> Artificial Constructs

<400> 9
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
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 1                    5   ·                  10              ·          15
Glu Pro Cys Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
                20                      25                  30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
                35                      40                  45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
        50                      55                  60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65                      70                  75                  80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
                85                      90                  95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
            100                     105                 110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
            115                     120                 125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
    130                     135                 140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145                     150                 155                 160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
                165                     170  ·              175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
            180                     185                 190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
            195                     200                 205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
    210                     215                 220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                     230                 235                 240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                     250                 255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
                260                     265                 270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
            275                     280                 285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
    290                     295                 300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                     310                 315                 320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                     330                 335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                     345                 350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
            355                     360                 365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                     375                 380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                     390                 395                 400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                405                     410                 415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                     425                 430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
            435                     440                 445
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12

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<400> 10
Glu Pro Lys Ser Cys Asp
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<210> 11
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 11
ttgcgatcgc taagaaagtg gtgctgggc                                    29

<210> 12
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 12
aatccggaag ctagcaccac gatgtc                                       26

<210> 13
<211> 30
<212> DNA
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<220>
<223> Primer

<400> 13
tccggattcc agaaggcctc cagcatagtc                                   30·

<210> 14
<211> 37
<212> DNA
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<220>
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<400> 14
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<211> 30
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ggcagatctg attatcaagt gtcaagtcca                                    30

<210> 16
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<220>
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caaacgcgtc aggaggcggg ctgcgatttg                                    30

<210> 17
<211> 61
<212> DNA
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<220>
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gggaagctgt acaggtcagt tccactgtag cgatcgctcc accacgcgtc aggaggcggg 60
c                                                                  61

<210> 18
<211> 61
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 18
gcccgcctcc tgacgcgtgg tggagcgatc gctacagtgg aactgacctg tacagcttcc 60
c                                                                  61
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